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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/765,543	01/19/2001	Hoe-Scong Ha	4591-160	1427

20575 7590 11/19/2003

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EXAMINER

ESTRADA, MICHELLE

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/765,543	HA ET AL.	
	Examiner	Art Unit	
	Michelle Estrada	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/6/03 has been entered.

Applicant's arguments are moot in view of the new grounds of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6-8, 10 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Takatsuka et al. (6,121,113) and Arafa et al. (6,294,823).

Takatsuka et al. discloses a semiconductor substrate (101) having a top surface; a device isolation region (108) formed in a predetermined region of the semiconductor substrate, the device isolation region having a protrusion that is higher than the top surface of the semiconductor substrate (101), the protrusion, in cross section, having a

sidewall that forms an obtuse angle with the top surface (Figs. 1F and 2A); wherein the device isolation region comprises a trench isolation region; further comprising a thermal oxide layer (107) interposed between the semiconductor substrate and the trench isolation region (Col. 2, lines 31-33).

Akatsu et al. does not disclose an etch stop spacer formed overlying the sidewall of the protrusion; and an etch stop layer formed over the resultant structure; an interlayer insulating layer formed over the resultant structure; and a contact hole opening the interlayer insulating layer, the contact hole exposing at least a portion of the impurity diffusion region; filling the contact hole and an interconnection line overlying the contact plug.

Arafa et al. discloses a isolation region (209) in a predetermined region of the substrate; a silicon nitride etch stop spacer (211) overlying the sidewall of the isolation region and a silicon nitride etch stop layer (220) formed in the resulting structure; an interlayer insulating layer; a contact hole opening the interlayer insulating layer and the etch stop layer; wherein the etch stop layer is partially etch; wherein the isolation region comprises a trench isolation region (Col. 3, line 13); a contact plug (117); wherein the contact hole exposes a portion of the etch stop spacer adjacent to the impurity diffusion region; the contact hole exposing at least a portion of the impurity diffusion region (Fig. 1); further comprising an interconnection line filling the contact hole (110); a contact plug (117) filling the contact hole.

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Takatsuka et al. and Arafa et al. to enable formation of the contact and further the etch stop layer provides additional protection to the gate structure.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Takatsuka et al. and Arafa et al. as applied to claims 1-4, 6-8, 10 and 18 above, and further in view of Akatsu et al. (6,319,794).

The combination of Takatsuka et al. and Arafa et al. does not disclose further comprising a silicon nitride liner interposed between the trench isolation region and the thermal oxide layer.

Akatsu et al. disclose a device isolation region (49) formed in a semiconductor substrate (10); a thermal oxide layer (11) interposed between the semiconductor substrate and the trench isolation region (Col. 8, lines 58-59); further comprising a silicon nitride liner (40) interposed between the trench isolation region and the thermal oxide layer (11) (Col. 10, lines 24-26).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Takatsuka et al., Arafa et al. and Akatsu et al. to enable formation of the isolation region. Furthermore, the nitride liner is substantially divot free according to the teachings of Akatsu et al.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Takatsuka et al. and Arafa et al. as applied to claims 1-4, 6-8, 10 and 18 above, and further in view of Noda (6,373,119).

The combination of Takatsuka et al. and Arafa et al. does not disclose an interconnection line overlying the contact plug.

Noda discloses an interconnection line (12) overlying a contact plug (11) (Col. 10, lines 30-34).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Takatsuka et al., Arafa et al. and Noda to enable formation of the contact and further the interconnection line connects the contact plug.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Estrada whose telephone number is (703) 308-0729. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


MEstrada

November 14, 2003


George Fourson
Primary Examiner
Art Unit 2823